

REMARKS

Claims 1-9 were examined and reported in the Office Action. Claims 1-9 are rejected. Claims 1, 4 and 9 are amended. Claims 1-9 remain.

Applicants request reconsideration of the application in view of the following remarks.

I. 35 U.S.C. § 103(a)

A. It is asserted in the Office Action that claims 1, 4, 5, 8 and 9 are rejected in the Office Action under 35 U.S.C. § 103(a), as being unpatentable over Patent No. 6,094,972 issued to Yasutake et al ("Yasutake") in view of U. S. Patent No. 5,598,327 issued to Somerville et al ("Somerville"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

According to MPEP §2142

[t]o establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. (In re Vaeck, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)).

Further, according to MPEP §2143.03, "[t]o establish prima facie obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. (In re Royka, 490 F.2d 981, 180 USPQ 580 (CCPA 1974))." *"All words in a claim must be considered in judging the patentability of that claim against the prior art."* (In re Wilson, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970), emphasis added.)

Applicant's amended claim 1 contains the limitations of

a sensing means for sensing a sample surface based on an amplitude variation in a resonant frequency of the sensing means by keeping a uniform distance from the sample which is moving in X and Y directions; a frequency transforming means for transforming the sensed signal in the sensing means to a first signal in the form of frequency; a frequency combining means for combining the first signal and a second signal outputted from a frequency generator to generate a combined signal, wherein the second signal is identical to the resonant frequency and is a higher frequency compared to the first signal; and a single actuator for actuating the sensing means in response to the first signal which is a low frequency compared to the second signal and providing the combined signal to the sensing means to actuate the sensing means selectively at the second signal, the single actuator to oscillate a cantilever coupled to the single actuator with the second signal that is separated from the combined signal, wherein the apparatus scans the sample surface in a non-contact mode.

Applicant's amended claim 9 contains the limitations of

scanning a sample surface using a non-contact frequency response separation scheme, said frequency response separation scheme including: sensing the sample surface based on the amplitude variation of a resonant frequency of a sensing means by keeping a uniform distance from the sample which is moving in X and Y directions; transforming the sensed signal to a first signal in a form of frequency; combining the first signal and a second signal outputted from a frequency generator to generate combined signal, wherein the second signal is identical to a resonant signal and is a higher frequency compared to the first signal; transferring the combined signal to a single actuator through a feedback loop; and actuating a cantilever in the sensing means in response to the first signal which is a low frequency compared to the second signal and executing the frequency response separation by providing the combined signal to the sensing means to actuate the cantilever selectively at the second signal.

Yasutake discloses a sampling scanning probe where a cantilever is reciprocated along lower/upper directions on a surface of a sample. Further, Yasutake discloses that "the times when the probe taps the sample surface can be greatly reduced, as compared to those of the conventional tapping mode... (Yasutake, column 2, lines 54-57). That is,

Yasutake is concerned with reducing damage to a sample by reducing contact with the sample during tapping mode. Yasutake is not concerned with a non-contact scanning using frequency response separation device or method. Simply put, Yasutake does not teach, disclose or suggest the limitations contained in amended claim 1 of “the apparatus to scan the sample surface in a non-contact mode” nor the limitations contained in amended claim 9 of scanning a sample surface using a non-contact frequency response separation scheme.

Somerville discloses a planar transformer having a non-overlapping structure where the order of the various windings lessen electric field gradients and reduces electric field coupled noise currents. Somerville is not concerned, at all, with a non-contact scanning using frequency response separation device or method. Therefore, Somerville could never teach, disclose or suggest the limitations contained in amended claim 1 of “the apparatus to scan the sample surface in a non-contact mode” nor the limitations contained in amended claim 9 of scanning a sample surface using a non-contact frequency response separation scheme.

Moreover, neither Yasutake, Somerville, nor the combination of the two teach, disclose or suggest a single actuator for actuating the sensing means in response to the first signal which is a low frequency compared to the second signal and providing the combined signal to the sensing means to actuate the sensing means selectively at the second signal, the single actuator to oscillate a cantilever coupled to the single actuator with the second signal that is separated from the combined signal.

Therefore, even if Yasutake and Somerville were combined, the resulting invention would still not teach, disclose or suggest the limitations contained in Applicant's amended claims 1 and 9, as listed above. Since neither Yasutake, Somerville, nor the combination of the two, teach, disclose or suggest all the limitations of Applicant's amended claims 1 and 9, as listed above, Applicant's amended claims 1 and 9 are not obvious over Yasutake in view of Somerville since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claims that directly or indirectly depend from amended claim 1, namely claims 4-5 and 8, would also not be obvious over Yasutake in view of Somerville for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for claims 1, 4-5, and 8-9 are respectfully requested.

B. It is asserted in the Office Action that claims 2 and 6 are rejected in the Office Action under 35 U.S.C. § 103(a), as being unpatentable over Yasutake in view of Somerville, and in further view of U. S. Patent No. 5,666,190 issued to Quate et al ("Quate"). Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claims 2 and 6 either directly or indirectly depend on amended claim 1. Applicant has addressed Yasutake in view of Somerville regarding amended claim 1 above in section I(A).

Quate discloses a lithography system includes an array of cantilevers. In Quate, the tip of the cantilever is located close to a photoresist surface and the resonant frequency of the cantilever is determined by forces that exist between the tip and the surface. The resonant frequency is changed by the gradient of these forces. (Quate, column 2, lines 1 - 7). Quate further discloses that when the gap between the tip of the cantilever and the surface changes, the forces vary and the resonant frequency is altered. In Quate, a feedback system that adjusts the distance of the tip and the surface to maintain the resonant frequency constant, which in turn holds the gap between the tip and the surface constant. Also, Quate discloses that the amplitude of the oscillations can be detected and used to control the gap between the tip and the surface.

Quate, however, does not teach, disclose or suggest a frequency transforming means for transforming the sensed signal in the sensing means to a first signal in the form of frequency; a frequency combining means for combining the first signal and a second signal outputted from a frequency generator to generate a combined signal, wherein the second signal is identical to the resonant frequency and is a higher frequency compared to the first signal; a single actuator for actuating the sensing means in response to the first signal which is a low frequency compared to the second signal and providing the combined signal to the sensing means to actuate the sensing means selectively at the second signal, the single actuator to oscillate a cantilever coupled to

the single actuator with the second signal that is separated from the combined signal, wherein the apparatus scans the sample surface in a non-contact mode.

Therefore, even if Yasutake, Somerville and Quate were combined, the resulting invention would still not teach, disclose or suggest the limitations contained in Applicant's amended claim 1, as listed above. Since neither Yasutake, Somerville, Quate, nor the combination of the three, teach, disclose or suggest all the limitations of Applicant's amended claim 1, as listed above, Applicant's amended claim 1 is not obvious over Yasutake in view of Somerville in further view of Quate since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claims that directly or indirectly depend from amended claim 1, namely claims 2 and 6, would also not be obvious over Yasutake in view of Somerville and further in view of Quate for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for claims 2 and 6 are respectfully requested.

C. It is asserted in the Office Action that claim 3 is rejected in the Office Action under 35 U.S.C. § 103(a), as being unpatentable over Yasutake in view of Somerville and further in view of Honma. Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claim 3 directly depends on amended claim 1. Applicant has addressed Yasutake in view of Somerville regarding amended claim 1 above in section I(A).

Honma discloses a feedback control circuit for a scanning probe microscope having a vibrationally driven cantilever with a probe mounted at a distal end of the cantilever at a frequency near the resonance frequency. A light detector measures deflection of the cantilever in response to a repulsive force acting between the probe and a surface of a sample. Two output signals are produced from the measured deflection, which vary depending upon deflection of the cantilever and a detected signal having the vibrating frequency of the cantilever. The two signals are added for providing feedback to keep a constant distance between the probe and the sample

surface. Honma further discloses oscillator 8 and Piezo-electric element 6 control the cantilever (Honma, column 3, lines 14-18).

Honma, however, does not teach, disclose or suggest

the second signal is identical to the resonant frequency and is a higher frequency compared to the first signal; and a single actuator for actuating the sensing means in response to the first signal which is a low frequency compared to the second signal and providing the combined signal to the sensing means to actuate the sensing means selectively at the second signal, the single actuator to oscillate a cantilever coupled to the single actuator with the second signal that is separated from the combined signal, wherein the apparatus scans the sample surface in a non-contact mode.

Therefore, even if Yasutake, Somerville and Honma were combined, the resulting invention would still not teach, disclose or suggest the limitations contained in Applicant's amended claim 1, as listed above. Since neither Yasutake, Somerville, Honma, nor the combination of the three, teach, disclose or suggest all the limitations of Applicant's amended claim 1, as listed above, Applicant's amended claim 1 is not obvious over Yasutake in view of Somerville in further view of Honma since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends from amended claim 1, namely claim 3, would also not be obvious over Yasutake in view of Somerville and further in view of Honma for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejection for claim 3 is respectfully requested.

D. It is asserted in the Office Action that claim 7 rejected in the Office Action under 35 U.S.C. § 103(a), as being unpatentable over Yasutake in view of Somerville. Applicant respectfully traverses the aforementioned rejection for the following reasons.

Applicant's claim 7 directly depends on amended claim 1. Applicant has addressed Yasutake in view of Somerville regarding amended claim 1 above in section I(A).

As asserted above, even if Yasutake and Somerville were combined, the resulting invention would still not teach, disclose or suggest the limitations contained in

Applicant's amended claim 1, as listed above. Since neither Yasutake, Somerville, nor the combination of the two, teach, disclose or suggest all the limitations of Applicant's amended claim 1, Applicant's amended claim 1 is not obvious over Yasutake in view of Somerville since a *prima facie* case of obviousness has not been met under MPEP §2142. Additionally, the claim that directly depends from amended claim 1, namely claim 7, would also not be obvious over Yasutake in view of Somerville for the same reason.

Accordingly, withdrawal of the 35 U.S.C. § 103(a) rejections for claim 7 is respectfully requested.

CONCLUSION

In view of the foregoing, it is believed that all claims now pending, namely 1-9, patentably define the subject invention over the prior art of record and are in condition for allowance and such action is earnestly solicited at the earliest possible date.

If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly extension of time fees. If a telephone interview would expedite the prosecution of this Application, the Examiner is invited to contact the undersigned at (310) 207-3800.

Respectfully submitted,

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Dated: September 15, 2005

By: _____

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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the United States Postal Service as First Class Mail with sufficient postage in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P. O. Box 1450, Alexandria, Virginia 22313-1450 on September 15, 2005.

Jean Svoboda